

DATA PROCESSING SYSTEM USING GESTURE-BASED INPUT DATA

This is a continuation of application Ser. No. 5 07/616,447, filed Nov. 20, 1990, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a data processing system 10 comprising a display for visualizing the processing operations carried out by the system.

2. Description of the Related Art

Such systems are widely known and used, the system's display functioning as an interface with the user. 15 The display may play the part, for instance, of a feedback means for visualizing the system's operating state, whereupon the user may take some action in order to control the system's operation on the basis of the information displayed. Likewise, the display may function as a link in a communication channel between two or more users communicating through the system.

Interaction with and communication via the system by means of a display involves the exchange of information between the system and the user in a format that should be adapted to the user's perception, and that in addition should be transformable into a format that enables efficient processing by the system. 25

Various ways are known for representing and visualizing information on a display for accomplishing a dialogue with or through the system. An example thereof is the displaying of text, generated as a result of the system's operation and to be read by the user, and the inputting of text (e.g. instructions) into the system via a keyboard or by selecting a displayed field with a text, data associated therewith being input by guiding a cursor towards that field by manipulating a mouse and clicking an appropriate button. 30

Another example is the manipulation of a joy-stick or another control device, movements thereof or forces exerted thereon being translated into associated actions of a displayed cursor or another object. 35

Still another example relates to the inputting of data via a digitizing tablet or touch screen coupled with the display, for instance for inputting handwritten text or handdrawn figures, the display functioning partly as a visual feedback means. 40

For various applications the communication via and interaction with the system could be improved by adapting the way in which the data is manifested on the display. 45

SUMMARY OF THE INVENTION

An object of the invention is to provide a data processing system comprising a display for visualizing the data processing, that uses an appropriate code (or language) for representing the displayed information to be perceived by the user, and which reduces the bandwidth of the signal transfer representing the dialogue with or via the system, thereby leading towards a faster and less tiresome interaction between the user and the system and communication via the system. 50

To this end, a data processing system according to the invention is characterized in that the system further comprises 55

figure-forming means for generating on the display an image of a schematized human hand; and

control means coupled with the figure-forming means for controlling the posture of the hand image or a sequence of postures of hand images to provide communication via the system or interaction with the system by means of a hand posture language which includes at least two different hand forms postures.

The communication and interaction by means of a hand posture code for expressing information or additional information has particular advantages for in a visual way enriching audio communication by natural gestures of the hand image or for visualizing the intended manipulation with or the attribution of a particular meaning to a displayed object by an associated posture of the hand image. Moreover, a language based on natural gestures is easy to learn. In addition, a gesture language may provide a low bandwidth communication tool when performing operations on displayed figures in both the interactive mode or in the communication mode. For instance, a schematized hand image with a pointing index finger may be used for indicating a displayed data field or a displayed object, e.g. for selection of or for focussing attention on a particular field or object. Other examples of imitated gestures may indicate the artificial equivalent of: 25

switching a schematized pointing hand between displayed data items for indicating a relationship there-between;

the intention of removing a particular shown object, by waving the schematized hand nearby or over the object;

indicating a desired change of the size of a particular object by showing a schematized hand, the index finger and thumb of which approach each other or move away from each other when asking for a reduction or magnification, respectively;

indicating the intended relocation of an object by grasping with the schematized hand the imaginary object and displacing it over a short distance. 30

It should be noted that in addition to separate and stationary schematized hand images for representing respective signs, sequences of schematized hand images in particular are suited to the expression of compound signs. For instance, a particular operation to be executed on a particular object may be indicated by a selection sign succeeded by a sign or a sequence of signs corresponding to the particular operations. 35

As the meaning of such gestures is readily perceived and the information is presented in a condensed format, interaction with and communication via the system proceeds rapidly and in a natural way, even when the gesture-vocabulary is restricted to only a few, for example 6, different signs, taking into account various combinations of the gestures for generating compound signs. 40

A restricted vocabulary has the advantages that a user may readily adapt to this kind of data communication and retain the acquired skill once learned. Moreover, the bandwidth of the system's communication channels and the system's memory capacity for storage of the vocabulary, as far as they are related to the hand posture code, may be kept limited, thereby saving cost and gaining speed. 45

It should be noted that both the communication through the system and interaction with the system may occur alternately using the same hand posture language. In other words, the hand posture signs as interpreted by the user correspond with the operations executed by the 50